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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/816,170	04/02/2004	Heine Melle Mulder	081468-0309024	7878
909	7590	08/09/2005	EXAMINER	
PILLSBURY WINTHROP SHAW PITTMAN, LLP			GUTIERREZ, KEVIN C	
P.O. BOX 10500			ART UNIT	
MCLEAN, VA 22102			PAPER NUMBER	
			2851	

DATE MAILED: 08/09/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

AK

Office Action Summary	Application No.	Applicant(s)	
	10/816,170	MULDER ET AL.	
	Examiner	Art Unit	
	Kevin Gutierrez	2851	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on April 02, 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-16 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-16 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 02 April 2004 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Specification

1. The disclosure is objected to because of the following informalities:
 - a. Page 11, [0048], line 1 - "Figure 2 illustrates... " (the underlined text should be replaced with 2a, as respectfully suggested by the examiner).
 - b. The specification fails to provide the description for Figures 2b - 2g.Appropriate correction is required.

2. The specification is objected to as failing to provide proper antecedent basis for the claimed subject matter. See 37 CFR 1.75(d)(1) and MPEP § 608.01(o). Correction of the following is required: the distinct location of the claimed optical element is not disclosed (claim 4).
Appropriate correction is required.

Drawings

3. The drawings are objected to as failing to comply with 37 CFR 1.84(p)(5) because they do not include the following reference sign(s) mentioned in the description: Fig. 2a, reference 2. Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application.

4. The drawings are objected to under 37 CFR 1.83(a) because they fail to show page 11, [0049], line 4 - reference 22 as described in the specification. Any structural detail that is essential for a proper understanding of the disclosed invention should be shown in the drawing. MPEP § 608.02(d).

5. The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, the following must be shown or the feature(s) canceled from the claim(s):

a. Page 14, claim 4 - optical element is disposed downstream of said reflective integrator in a pupil plane.

b. In reference to claims 4-12, the distinct location of the claimed optical element is unclear.

b. Fig. 4, the location of references 41-43 is unclear nor shown in the figures of the present invention.

c. Fig. 5, the location of the displayed element(s) is unclear nor shown in the figures of the present invention. In addition, the examiner respectfully requests a reference value to be assigned to the displayed element(s) corresponding to its description within the specification.

No new matter should be entered.

Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the

immediate prior version of the sheet, even if only one figure is being amended. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Claim Rejections - 35 USC § 103

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The applied reference has a common assignee with the instant application. Based upon the earlier effective U.S. filing date of the reference, it constitutes prior art only under 35 U.S.C. 102(e). This rejection under 35 U.S.C. 103(a) might be overcome by: (1) a showing under 37 CFR 1.132 that any invention disclosed but not claimed in the reference was derived from the inventor of this application and is thus not an invention "by another"; (2) a showing of a date of invention for the claimed subject matter of the application which corresponds to subject matter disclosed but not claimed in the reference, prior to the effective U.S. filing date of the reference under 37 CFR 1.131; or (3) an oath or declaration under 37 CFR 1.130 stating that the application and reference are currently owned by the same party and that the inventor named in the application is the prior inventor under 35 U.S.C. 104, together with a terminal disclaimer in accordance with 37 CFR 1.321(c). This rejection might also be overcome by showing that the reference is disqualified under 35 U.S.C. 103(c) as prior art in a rejection under 35 U.S.C. 103(a). See MPEP § 706.02(l)(1) and § 706.02(l)(2).

7. As best the examiner can ascertain the claimed invention, claims 1, 4, 13 and 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kawahara (US 2004/0021845) in view of Yamazaki et al (US 2003/0198050).

Regarding claims 1, 13 and 16, Kawahara discloses

- “an illumination system (fig. 1, #1-16) for providing a projection beam of radiation,
- a support structure for supporting a patterning device (fig. 1, #18), the patterning device serving to impart the projection beam with a pattern of its cross-section ([0053], lines 4-5);
- a substrate table (fig. 1, #22) for holding a substrate (fig. 1, #21);
- a projection system for projecting the patterned beam onto a target portion of the substrate ([0053], lines 3-6);
- “a reflective integrator (fig. 1, #38, *the specification mistakenly refers reference #38 as reference #30*) disposed along an optical axis (fig. 1, [0007], lines 6-7, and see dashed lines through center of #8-25) of the lithographic apparatus (fig.1, #100),
- an optical element (fig. 1, #25), constructed and arranged to redistribute an intensity distribution exiting the reflective integrator such that the intensity distribution is asymmetric with respect to at least one of the X and Y axes ([0070], lines 9-11, where the aperture serves to vary shape of light source).”

Kawahara does not disclose “the reflective integrator having a rectangular cross-section perpendicular to said optical axis, the cross-section having sides parallel to mutually perpendicular X and Y axes;”

However, “the reflective integrator having a rectangular cross-section perpendicular to said optical axis, the cross-section having sides parallel to mutually

perpendicular X and Y axes” is known in the art as evident by Yamazaki et al ([0065], lines 1-3 and fig. 1, #80 is the optical axis). Thus, it would have been obvious to one ordinary skilled in the art at the time the invention was made to modify the reflective integrator of Kawahara to include a rectangular integrator perpendicular to the optical axis. The ordinary artisan would have been motivated to modify Kawahara in a manner described above for at least the purpose to provide a reference image.

Regarding claim 4, Kawahara further discloses “wherein said optical element (fig. 1, #11) is disposed downstream of said reflective integrator in a pupil plane of said illumination system (fig. 1, #11 is downstream from #38 near where lines converge towards the center of #38).”

8. Claims 2, 3, 14 and 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kawahara in view of Yamazaki et al, as applied to claims 1, 4, 13 and 16 above, and in further view of Suzuki et al (US 2001/0015797).

Modified Kawahara further discloses “wherein said optical element is constructed and arranged to rotate an intensity distribution of a beam of radiation around said optical axis (figs. 10 and 11 express the effective light source produced by variable aperture stop, which is capable to vary angle, [0071], lines 17-20).”

Modified Kawahara does not disclose where the intensity distributions of the radiation beam are rotated “over an angle between 5 and 85 degrees.”

However, having “intensity distributions of the radiation beam rotated “over an angle between 5 and 85 degrees” is known in the art as taught by Suzuki ([0052], lines

9-11). Thus, it would have been obvious to one ordinary skilled in the art at the time the invention was made to further modify Kawahara as modified by having the varying aperture rotate intensity distributions in a manner described above for at least the purpose to provide a reference beam.

9. Claims 5, 6, and 8-10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kawahara in view of Yamazaki et al, as applied to claims 1, 4, 13 and 16 above, and in further view of Kakuchi et al (US 2005/0099635).

Kawahara further discloses an optical element that is “constructed and arranged to reallocate part of the intensity distribution of said beam ([0070], lines 10-11)”; “a distance between the optical axis and said part of the intensity distribution upstream of said optical element is equal to said distance downstream of said optical element ([0008], lines 7-10)”; “constructed and arranged to rotate substantially a whole intensity distribution of said beam of radiation ([0074], lines 2-3 and [0073], lines 13-14, where the plural plates can be rotated entirely).”

Kawahara as modified does not disclose

- (claim 5) the optical element that includes a pair of reflective surfaces.
- (claim 8) a pair of reflective surface are planar and parallel to each other
- (claim 9) the optical element includes two pairs of reflective surfaces
- (claim 10) where the plural plates are pairs of reflective surfaces

However, Kakuchi et al teaches “optical element includes at least one pair of reflective surfaces (fig. 1, #21 and #22 are reflective surfaces)”; “wherein said at

least one pair of reflective surfaces are planar and parallel to each other so that a direction of a ray of said beam of radiation of said optical element equals a direction of said ray downstream of said optical element upstream of said element” (fig. 1, #21 and #22)”; “wherein the optical element includes two pairs of reflective surfaces, each pair of reflective surfaces constructed and arranged to reallocate one of two respective poles of said intensity distribution (fig. 1, #21-22 are reflective surfaces and ([0028], lines 10-12)”; “wherein said optical element includes a plurality of pairs of reflective surfaces (fig. 1, #10-11 and #21-22 are reflective surfaces).” Thus, it would have been obvious to one ordinary skilled in the art at the time the invention was made to further modify Kawahara as modified to include the aforementioned teaching of Kakuchi et al for at least the purpose of providing a reference beam.

10. Claim 7 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kawahara in view of Yamazaki et al and Kakuchi et al, as applied to claims 5, 6 and 8-10 above, and in further view of Shinoda (US 2002/0001134).

Kawahara as modified discloses all of the claimed limitations except the reflective surfaces include coated mirrors.

However, mirror-like coating on reflective surfaces is well known in the art as taught by Shinoda ([0004], line 9). Thus, it would have been obvious to one ordinary skilled in the art at the time the invention was made to coat the reflective surfaces of Kawahara to have a mirror-like coating for at least the purpose of maintaining a longer exposure interval.

11. Claim 11 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kawahara in view of Yamazaki et al and Kakuchi et al, as applied to claims 5, 6 and 8-10 above, and in further view of Izumi et al (US2005/0046837).

Modified Kawahara teaches all the claimed limitations except the mirror blades to have reflective coatings at both sides.

However, further including “mirror blades including a reflective coating at both sides” is well-known in the art as taught by Izumi et al (fig. 1, #20 and [0090], lines 12-13), where #20 is a VIPA plate with reflective surfaces).” Thus, it would have been obvious to one ordinary skilled in the art at the time the invention was made include reflective surfaces at both sides of plural blades of the optical element of Kawahara as modified for at least the purpose of utilizing various wavelengths.

12. Claim 12 is rejected under 35 U.S.C. 103(a) as being obvious over Kawahara in view of Yamazaki et al, Kakuchi et al, and Izumi et al, as applied to claim 11 above, and in further view of Mulkens et al (US 2004/0051858).

Kawahara as modified teaches all the claimed limitations except the thickness of the mirror blades to vary as a function of distance and angle.

However, having “wherein a thickness of said mirror blades varies as a function of distance from the optical axis and as a function of angle around the optical axis” is well known in the art as taught by Mulkens et al ([0049], lines 5-9). Thus, it would have been obvious to one ordinary skilled in the art at the time the invention was

made to further modify Kawahara as modified by having a varying thickness of plural blades with reflective surfaces, as a function of distance and as a function of angle from and around the optical axis, for at least the purpose to reduce the cost of production.

Conclusion

13. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Toyoda et al (US 2003/0038931) discloses an illumination optical system that has a pupil shape forming unit and Shiraishi (US 2003/0043356) discloses an illumination system that increases intensity distribution of a portion apart from the optical axis.

14. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Kevin Gutierrez whose telephone number is (571)-272-5922. The examiner can normally be reached on Monday-Friday: 7:30 a.m. - 4:30 p.m..

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Judy Nguyen can be reached on (571)-272-2258. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Art Unit: 2851

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Kevin Gutierrez
Examiner
Art Unit 2851

August 8, 2005


JUDY NGUYEN
SUPERVISORY PATENT EXAMINER